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(published jointly with *Novática**)

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Presentation

Trends and Advances in Risk Management

Darren Dalcher

1 Introduction

Risks can be found in most human endeavours. They come from many sources and influence most participants. Increasingly, they play a part in defining and shaping activities, intentions and interpretations, and thereby directly influencing the future. Accomplishing anything inevitably implies addressing risks. Within organisations and society at large, learning to deal with risk is therefore progressively viewed as a key competence expected at all levels.

Practitioners in computing and information technology are at the forefront of many new developments. Modern society is characterised by powerful technology, instantaneous communication, rising complexity, tangled networks and unprecedented levels of interaction and participation. Devising new ways of integrating with modern society inevitably imply learning to co-exist with higher levels of risk, uncertainty and ignorance. Moreover, society engages in more demanding ventures whilst continuously requiring performance and delivery levels that are better, faster and cheaper. Developers, managers, sponsors, senior executives and stakeholders are thus faced with escalating levels of risk.

In order to accommodate and address risk we have built a variety of mechanisms, approaches and structures that we utilise in different levels and situations. This special issue brings together a collection of reflections, insights and experiences from leading experts working at the forefront of risk assessment, analysis, evaluation, management and communication. The contributions come from a variety of domains addressing a myriad of tools, perspectives and new approaches required for making sense of risk at different levels within organisations. Many of the papers report on new ideas and advances thereby offering novel perspectives and approaches for improving the management of risk. The papers are grounded in both research and practice and therefore deliver insights that summarise the state of the discipline whilst indicating avenues for improvement and placing new trends in the context of risk management and leadership in an organisational setting.

2 Structure and Contents of the Monograph

The thirteen papers selected for the issue showcase four perspectives in terms of the trends identified within the risk management domain. The first three papers report on new tools and approaches that can be used to identify complex dependencies, support decision making and develop improved capability for uncertainty modelling. The following four papers look at new ways of interacting with risk man-

The Guest Editor

Darren Dalcher – PhD (Lond) HonFAPM, FBCS, CITP, FCMI – is a Professor of Software Project Management at Middlesex University, UK, and Visiting Professor in Computer Science in the University of Iceland. He is the founder and Director of the National Centre for Project Management. He has been named by the Association for Project Management, APM, as one of the top 10 "movers and shapers" in project management and has also been voted Project Magazine's Academic of the Year for his contribution in "integrating and weaving academic work with practice". Following industrial and consultancy experience in managing IT projects, Professor Dalcher gained his PhD in Software Engineering from King's College, University of London, UK. Professor Dalcher is active in numerous international committees, steering groups and editorial boards. He is heavily involved in organising international conferences, and has delivered many keynote addresses and tutorials. He has written over 150 papers and book chapters on project management and software engineering.

He is Editor-in-Chief of *Software Process Improvement and Practice*, an international journal focusing on capability, maturity, growth and improvement. He is the editor of a major new book series, *Advances in Project Management*, published by Gower Publishing. His research interests are wide and include many aspects of project management. He works with many major industrial and commercial organisations and government bodies in the UK and beyond. Professor Dalcher is an invited Honorary Fellow of the Association for Project Management (APM), a Chartered Fellow of the British Computer Society (BCS), a Fellow of the Chartered Management Institute, and a Member of the Project Management Institute, the Academy of Management, the IEEE and the ACM. He has received an Honorary Fellowship of the APM, "a prestigious honour bestowed only on those who have made outstanding contributions to project management", at the 2011 APM Awards Evening. <d.dalcher@mdx.ac.uk>

agement and the development of new perspectives and lenses for addressing uncertainty and the emergence of risk leadership, thereby encouraging a new understanding of the concept of risk. The next two papers report on results from empirical studies related to differences in the perception of decisions between managers of projects and programmes and on the difference that risk management can make in avoiding IT project failures. The final four papers look at the development of decision making and risk man-

“Practitioners in computing and information technology are at the forefront of many new developments”

agement infrastructure by addressing areas such as strategic project risk appraisal, project governance, selection of alternative projects at the portfolio level and the development of enterprise risk management.

Many risk calculations, especially in banking and insurance, are derived from statistical models operating on carefully collected banks of historical data. The other typical approach relies on developing risk registers and quantifying the exposure to risk by identifying and estimating the probability and the loss impact. The paper by *Fenton and Neil* encourages practitioners to look beyond simple causal explanations available through identification of correlation or the somewhat ‘accidental’ figures developed through registers. In order to obtain a true measure of risk, practitioners must therefore develop a more holistic perspective that embraces a causal view of dependencies and interconnectedness of events. Bayes networks have long been used to depict relationships and conditional dependencies. The authors show how risks can be modelled as event chains with a number of possible outcomes, enabling the integration of risks from multiple perspectives and the decomposition of a risk problem into chains of interrelated events. As a result, control and mitigation measures may become more obvious through the process of modelling risks and the identification of relationships and dependencies that extend beyond simple causal explanations.

Project planning is initiated during the earlier part of a project, when uncertainty is at its greatest. The resulting schedules often fail to capture the full detail of reality. Moreover, they fail to account for change. The paper by *Trumper and Virine* proposes Event Chain methodology as an approach for modelling uncertainty and evaluating the impacts of events on project schedules. Event chain methodology is informed by ideas from other disciplines and has been used as a network analysis technique in project management. Tools such as event chain diagrams visualise the complex relationships and interdependencies between events. The collection of tools and diagrams support the planning, scheduling and monitoring of projects allowing management to visualise some of the issues and take corrective action. The Event Chain methodology takes into account factors such as delays, chains and complex dynamics that are not acknowledged by other scheduling methods. They attempt to overcome human and knowledge limitations and enable updating of schedules in light of new information that emerges throughout the development process.

Complex relationships and interdependencies between casus and effects require more complex method of modelling the impacts and influences between factors. Moreover the dynamics emerging from the uncertain knowledge ne-

cessitate a deeper understanding of causal interactions. The paper by *Rodrigues* highlights the use of systems dynamics to capture some of the closed chains of feedback operating with uncertain environments. Feedback loops and impact diagrams can show the effects of positive feedback cycles that can be used to “snowball” alongside other non-linear effects. Dynamic modelling provides an effective tool for identifying emergent risks resulting from complex interactions, interconnected chains of causes and events and chains of feedback. They encourage the adoption of holistic solutions by investigating the full conditions that play a part in a certain interaction, identifying the full chain of events leading to a risk. Moreover, as the model includes multiple variables, it becomes possible to assess the range of impacts on all aspects and objectives and determine the interactions of risks, events and causes in order to derive a better understanding of the true complexity and the behaviour of the risks.

Developing the right strategy for addressing risk depends on the context. Different approaches will appeal depending on the specific circumstances and the knowledge, and uncertainty associated with a situation. *Dalcher* contends that risk is often associated with danger, and makes use of the idea of safety to identify different positions on a spectrum with regards to our approach to risk. At one extreme, anticipation relies on developing full knowledge of the circumstances in advance. Addressing risks can proceed in a reasonably systematic manner through quantification and adjustments. The other alternative is to develop sufficient flexibility to enable the system to adopt a resilient stance that allows it to be ready to respond to uncertainties, as they emerge, in a more dynamic fashion. This is done by searching for the next acceptable state and allowing the system to evolve and grow through experimentation. While the ideal position is somewhere between the two extremes, organisations can try to balance the different perspectives in a more dynamic fashion. The adoption of alternative metaphors may also help to think about risk management in new ways. We often acknowledge that risk is all about perspective. If managers focus on safety as a resource, they can develop an alternative representation of the impacts of risk. The dynamic management of safety, or well being can thus benefit from a change of perspective that allows managers to engage with opportunities, success and the future in new ways.

Managing risk is closely integrated with project management. However, despite the awareness of risk and the recognition of the role of risk management in successfully delivering projects there is still evidence that risk is not being viewed as an integrated perspective that extends beyond processes. Indeed, the management of risk is not a precise and well-defined science: It is an art that relies on

“ This special edition brings together a collection of reflections, insights and experiences from leading experts working at the forefront of risk issues ”

attitudes, perceptions, expectations, preferences, influences, biases, stakeholders and perspectives. The paper by *Hillson* looks at how risk is managed in projects. Focusing on risks in a project, may ignore the risk that the overall project poses to the organisation, perhaps at a portfolio or programme level. The actual process of managing risks is often flawed as some of the links and review points are missing. Moreover, insufficient attention has been paid to the human component in risk assessment. Overall the process required for managing risks requires a more dynamic approach responsive to learning and change. Revisiting our current processes and rethinking our approach can serve to improve our engagement with risk, thereby improving the outcomes of projects.

The management of uncertainty, as opposed to risk, offers new challenges. The impact of uncertainty often defers decisions and delays actions as managers attempt to figure out their options. While risks can be viewed as the known unknowns, uncertainty is concerned with the unknown unknowns that are not susceptible to analysis and assessment. Increasingly, organisations allocate additional contingency resources for other things that we do not know about. The paper by *Cleden* contends that the management of uncertainty requires a completely different approach. Uncertainties cannot be analysed and formulated. Managing project uncertainty depends on developing an understanding of the life cycle of uncertainty. Projects exist in a continual state of dynamic tension with the accumulation of uncertainties contributing to pushing the project away from its expected trajectory. Managers endeavour to act swiftly to correct the deviations and must therefore apply a range of strategies required to stabilise the project. Uncertainties result from complex dynamics which will often defy organised attempts at careful planning. The solution is to adapt and restructure in a flexible and resilient fashion that will allow the project to benefit from the uncertainty. Small adjustments will thereby allow projects to improve and adjust whilst responding favourably to the conditions of uncertainty.

Project managers often have to deal with novel, one of a kind, unfocused and complex situations that can be characterised as ill structured. To reflect the open-ended, interconnected, social perspective, planners and designers talk of *wicked problems*. Such problems tend to be ill-defined and rely upon much elusive political judgement for resolution. The paper by *Hancock* points out that projects are not tame,

instead displaying chaotic, messy and wicked characteristics. Behavioural and dynamic complexities co-exist and interact confounding decision makers. Applying simplistic, sequential resolution processes is simply inadequate for messy problems. Problems cannot be solved in isolation require conceptual, systemic and social resolution. Moreover, solutions are likely to be good enough at best and will require stakeholder participation and engagement. The direct implication for tackling uncertainty and addressing complexity is that the managing risks mindset needs to be evolved into a risk leadership perspective. Such perspective would look to guide, learn and adapt to new situations. Different events, outcomes and behaviours would require adjustments and the risk process needs to adapt in order to overcome major political issues. To address the new uncertainties requires a move away from controlling risk towards a negotiated flexibility that accommodates the disorder and unpredictability inherent in many complex project environments.

Risk management is often proposed as a solution to the high failure rate in IT projects. However, the literature is at best inconclusive about the contributions of risk management to project success. The paper by *de Bakker* reports on a detailed literature review which only identified anecdotal evidence to this effect. A further analysis confirms that risk management needs to be considered in social terms given the interactive nature of the process and the limited knowledge that exists about the project and the desired outcomes. In the following stage, a collection of case studies identified the activity of risk identification as a crucial step contributing to success, as viewed by all involved stakeholders. It would appear that the action, understanding and reflection generated during that phase make recognisable contributions as identified by the relevant stakeholders. Risk reporting is likewise credited with generating an impact. An experiment with 53 project groups suggests that those that carried out a risk identification and discussed the results performed significantly better than those who did not. These groups also seemed to be more positive about their project and the result. The research suggests that it is the exchange and interaction that make people more aware of the issues. It also helps in forming the expectations of the different stakeholders groups. The discussion also has inevitable side effects, such as changing people's views about probabilities and values. Nonetheless, the act of sharing, discussing and deliberating appear to be crucial in forming a better

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crucial in forming a better understanding of the issues and their scale and magnitude.

The long held assumption of utilising linear sequences in order to address problems, guide projects and make decisions have contributed to the perception of project and risk management as engineering or technical domains. Some of the softer aspects related to the human side of interaction have been neglected over the years. *Dequire* points out that to accommodate complexity the softer aspects of human interaction need to be taken into account. Indeed, problem solving requires reflection, interaction and deliberation. Given that problems and decisions are addressed at the project management and in some organisations, also at programme management level, and that their approaches to solving problems require deliberations and reflection at a different level of granularity, it is interesting to contrast the perceptions and expectations of managers in these domains. In contrast with project managers, programme managers appear to favour inductive processes. The difference might relate to the need to deliver outcomes and benefits, rather than outputs and products. As the level of complexity rises, decisions become more context-related and less mechanistic. Decisions made by programme manager may relate to making choices about specific projects and determining wider direction and thus compel managers to engage with the problem and its context. Indeed, the need to define more of the assumptions in a wider context, forces deeper and wider consideration, involving people, preferences, context and organisational issues.

Early choices need to be made about selecting the right projects, committing resources and maintaining portfolios and programmes which are balanced. These decisions are taken at an early stage under conditions of uncertainty and can be viewed as strategic project decisions. The project appraisal process and the decision making behaviour that accompanies it clearly influence the resulting project. The paper by *Harris* explores the strategic level risks encountered by managers in different types of projects. This is achieved by developing a project typology identifying eight major types of strategic level projects and their typical characteristics. It provides a rare link between strategic level appraisal and risk management by focusing on the common risks shared by each type. The strategic investment appraisal process proposed in the work further supports the implementation of effective decision making ranging from idea generation and opportunity identification through preliminary assumptions to the findings of the post audit review. Overall, managers can be guided towards implementing a strategy that is better suited to the context of their project thereby enabling the development of a more flexible and

adaptable response. Identification of risks at an early stage enables better decision making when uncertainty is at its height.

The choice of the most suitable project is often subject to constraints regarding financial, technical, environmental or geographical constraints. Choices often have to be made at the project portfolio level to select the most viable, or useful approach. Alternatively, even when a project has been agreed in principle, there is still a need to determine the most suitable method for delivering the benefits. The paper by *Fernández-Diego and Munier* offers the use of linear programming method to support the choice of a particular approach and quantify the risks relevant for each of the options. The approach allows decision maker to maximise on the basis of particular threats (or benefits) and balance various factors. The use of linear programming in project management for quantifying values and measuring constraints is relatively new.

Large corporate failures in the last decade have raised awareness of the need for organisational governance functions to oversee the effectiveness and integrity of decision making in organisations. Governance spans the entire scope of corporate activity extending from strategic aspects and their ethical implications to the execution of projects and tasks. It provides the mechanisms, frameworks and reference points for self-regulation. Project governance is rapidly becoming a major area of interest for many organisations and is the topic of the paper by *Müller*. Governance sets of boundaries for project management action by defining the objectives, providing the means to achieve them and evaluating and controlling progress. The orientation of the organisation in terms of being share holder and stakeholder oriented, and the control focus on outcome or behaviour would play a key part in identifying the most suitable governance paradigm which can range between conformist, and agile pragmatist to versatile artist. The paradigm in turn can shape the approach of the organisation to development, the processes applied and the overall orientation and structure. The governance of project management plays a part in directing the governance paradigm, which guides the governance of portfolios, programmes and projects. This helps to reduce the risk of conflicts and inconsistencies and support the achievement of organisational goals.

Focusing only on operational risks related to a specific implementation project is insufficient. Risk relates to and impact organisational concerns concerned with the survival, development and growth of an organisation. Specific projects will incur individual risks. They will also contribute to the organisation's risk and may impact other areas and efforts. The paper by *Jonas* introduces Enterprise Risk

“While there is still a long way to go, the journey seems to be both promising, and exciting”

Management as a wider framework used by the entire business to assess the overall exposure to risk, and the organisational ability to make timely and well informed decisions. The paper looks at the five steps required to implement a simple and effective enterprise Risk Management framework. The approach encourages horizontal integration of organisational risk allowing different units to become aware of the potential impacts of initiatives in other areas on their own future, targets, and systems. The normal expectation is for vertical integration where guidance and instructions are passed downwards and information is cascaded upwards. However the cross functional perspective allows integration and sharing across different functional units. Vertical management chains can be used to support leadership and provide the basis for improved decision making through enterprise-wide reporting. The required culture change is from risk management to managing risk. Facilitating the shift requires people to look ahead and make risk-focused decisions that will benefit their organisations. It also requires the support and reward mechanisms to recognise and support such a shift.

There are some common themes that run through the papers in this monograph. Most modern undertakings involve people: Processes cannot ignore the human element and focus on computational steps alone and therefore a greater attention to subjective perceptions, stakeholders and expectation pervades many of the articles. The context of risk is also crucial. Most authors refer to complex dynamics

and interactions. It would appear that our projects are becoming increasingly more complex and the risks we grapple with increasingly involve technical, social and environmental impacts. The unprecedented level of uncertainty seems to feature in many of the contributions. The direction advocated in many of the papers requires a growing recognition of the dynamics involved in interactions, of the need to lead and guide, of holistic and systemic aspect of solving problems, of the need to adapt and respond and of a need to adopt a more strategic, enterprise-wide view of situations.

3 Looking ahead

Risk management appears to be an active area for researchers and practitioners. It is encouraging to see such a range of view and perspectives and to hear about the advances being proposed. New work in the areas of decision making, uncertainty, complexity, problem solving, enterprise risk management and governance will continue to revitalise risk management knowledge, skills and competences. Risk management has progressed in the last 25 years, but it appears that the new challenges and the focus on organisations, enterprises, and wider systems will add new ideas and insights. In this issue leading researchers and practitioners have surveyed the development of ideas, perspectives and concepts within risk management opened a glimpse and given us a glimpse of the potential solutions. The journey from risk management towards the wider management of risk, opportunity and uncertainty feels exciting and worthwhile. While there is still a long way to go, the journey seems to be both promising, and exciting.

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In addition to the materials referenced by the authors in their articles, we offer the following ones for those who wish to dig deeper into the topics covered by the monograph.

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- <<http://www.best-management-practice.com/Risk-Management-MoR/>>.
- <<http://www.computerweekly.com/feature/Risk-Management-Software-Essential-Guide>>
- <<http://www.riskworld.com/>>
- <<http://www.riskworld.com/websites/webfiles/ws5aa015.htm>>
- Directory of risk management websites: <<http://www.riskworld.com/websites/webfiles/ws00aa009.htm>>
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